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OPERATOR'S MANUAL

VACUUM TUBE VOLT-OHMMETER
MODEL 311

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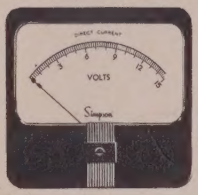

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MODEL 311

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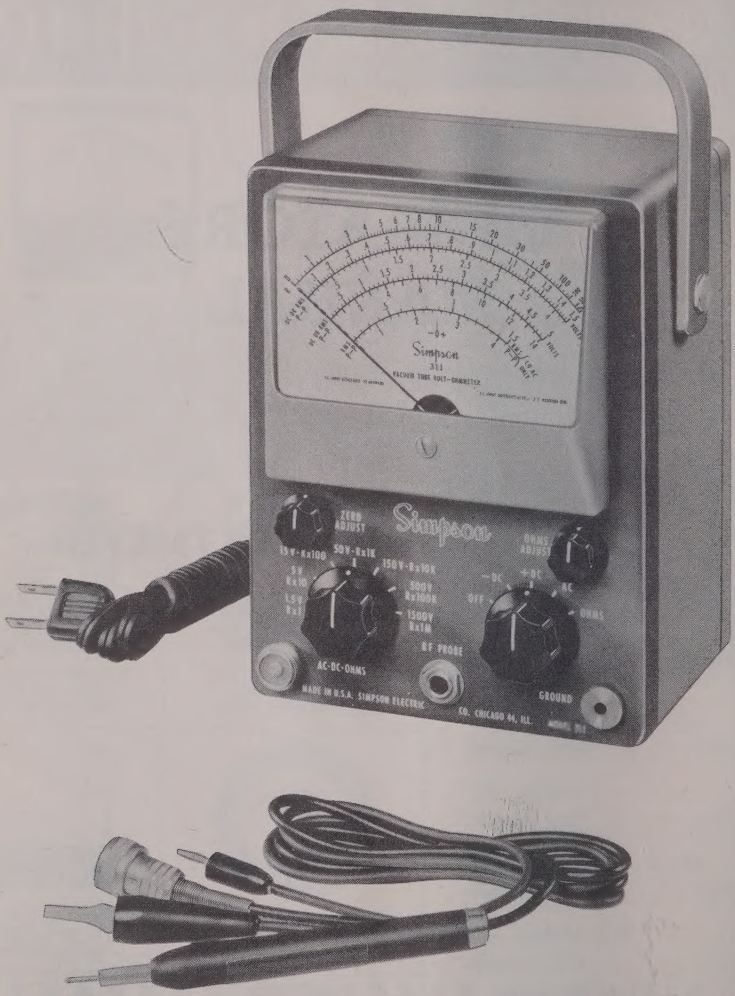

FIGURE 1. SIMPSON VACUUM TUBE VOLTMETER MODEL 311

Model 311

SECTION I

GENERAL DESCRIPTION

PURPOSE OF DESIGN

The Simpson Vacuum Tube Voltmeter Model 311 has been designed to provide laboratories, servicemen, and technicians with an advanced type of measuring instrument which will increase their ability to measure voltages without loading effects. This instrument has been enclosed in a durable metal case for safety and convenience, and also to prevent breakage. All the connections and controls are located conveniently on the front of the instrument. The large meter on the front panel provides easy reading and accurate indications for all of its applications.

TEST LEADS FURNISHED

Two test leads are furnished with the Model 311. One terminates on the instrument end in a banana jack, which fits into the front panel jack marked GROUND. The other end of this lead has a crocodile clip, covered with an insulator, with which the lead can be connected to the reference point in the circuit being measured. The second lead has a connector which fits on the AC-DC OHMS terminal on the front panel. The other end of this lead has a probe with a formed tip; the double hook on the probe tip permits this probe to be either pressed or hung in position while readings are being made in a circuit. A switch on the probe handle sets

up a direct connection for either AC or OHMS readings, or connects an isolating resistor into the circuit for DC readings.

POWER REQUIRED

The Simpson Vacuum Tube Voltmeter Model 311 requires 105 to 125 volts AC, 50 or 60 cycles for all measurements. Power consumption is 5 watts. In addition to the external AC power, there is a self-contained 1.5 volt battery which is used for DC resistance measurements.

ACCURACY

With an external power of 117.5 volts, 60 cycles AC, furnished to operate the instrument, accuracy is ±3% of full scale for DC voltages, ±5% of full scale for AC voltages, and ±3 degrees of arc for DC resistances.

ACCESSORY PROBES

An accessory RF probe is available to be used with the Model 311 for measuring RF voltages. This probe, and its test lead, will fit into the jack marked RF PROBE on the front panel. With it, voltages may be measured up to 150 volts R.M.S. (to 400 volts peak-to-peak) for frequencies up to 100 megacycles. Accuracy is ±5%. The peak-to-peak rectifier in the RF probe receives its filament voltage through the connections and circuits in the Model 311.

An accessory high DC voltage probe is also available to be used with the Model 311. With this probe, voltages may

be measured through 30,000 volts DC on a 0-50,000 volt indicating range.

For more information on these accessory probes, see Section V.

UNIQUE FEATURES

Every operation and indicating convenience has been included in this compact instrument. The controls on the front panel are limited to include only those which are necessary for operation. They include one range switch, one function switch, and two balancing controls.

- Meter markings include both R.M.S. and peak-to-peak indications for AC and RF voltage readings. Peak-to-peak applies to all waveform inputs; R.M.S. applies only when the input waveshape is a pure sine wave.

- A new probe design and probe tip permits all measurements to be made with the same probe and the convenience of maintained circuit contact with minimized personal attention from the operator.

- The high input impedance (22 megohms for DC) reduces circuit loading effects to less than any of the previous models of portable Vacuum Tube Voltmeters.

- The compact and convenient metal case, with the large easy-to-read meter, makes this the most efficient and practical Vacuum Tube Voltmeter available.

Conforming to the latest engineering developments, most of the component parts in the Model 311 are mounted on print-

ed circuit boards. This simplifies assembly and reduces maintenance, resulting in a lower cost assembly while retaining Simpson quality components.

The case dimensions of the Simpson Vacuum Tube Voltmeter Model 311 are 7-1/2 inches high by 5-5/8 inches wide by 4-1/2 inches deep. Its weight is 4-1/2 pounds. Shipping weight is 6 pounds.

RANGES AND INPUT SENSITIVITY

D.C. VOLTAGE MEASUREMENTS

Input resistance is 22 megohms for all ranges.

Ranges 0 to 1.5/5/15/50/150/500/1500 volts.

A.C. VOLTAGE MEASUREMENTS

All indications on the black arcs are R.M.S. values based on full wave rectification. Indications on the red arcs are peak-to-peak values. Input impedance is 2.2 megohms or more at 60 cycles.

Frequency response 30 to 100,000 cycles per second within ±5%.

Ranges 0 to 1.5/5/15/50/150/500/1500 volts R.M.S., 0 to 4.2/14/42/140/420/1400/4200 volts peak-to-peak.

OHMMETER MEASUREMENTS

Ranges	Center Scale Values
X1	10 ohms
X10	100 ohms
X100	1000 ohms
X1K	10K ohms
X10K	100K ohms
X100K	1 megohm
X1M	10 megohms

D.C. GALVANOMETER

Zero center D.C. voltage measurements available for any range. This is normally used for such applications as F-M discriminator alignment. When the instrument is set for the 1.5 volt DC range, the galvanometer operates as a .75-0-.75 volt meter.

SECTION II

OPERATION

CAUTION

WHEN MEASURING HIGH VOLTAGES, FIRST TURN OFF POWER IN THE CIRCUIT TO BE MEASURED AND DISCHARGE ALL CAPACITORS. CONNECT THE PROBES TO THE CIRCUIT AND THEN TURN ON CIRCUIT POWER. DO NOT TOUCH PROBES OR LEADS WHILE POWER IS ON. TURN OFF POWER AND DISCHARGE CAPACITORS BEFORE PROBES ARE DISCONNECTED OR MOVED.

USING NEW STYLE PROBE TIP

The end of the probe tip has a specially designed S-hook. Use this to either rest on or hook around each test point to be measured. This design allows the operator to look away from the test point to observe the meter or to watch action in other parts of the circuit without loosing contact for the measurement.

METER ZERO ADJUSTMENT (MECHANICAL)

Before turning on power in the Model 311, be sure that the meter pointer rests on zero. If the pointer is off zero, adjust it by means of the slotted screw located in the meter cover just below the scale. Use a small screwdriver to turn this adjustment slowly right or left until the pointer rests directly over the zero marks at the left of the scale.

FRONT PANEL CONTROLS

CIRCUIT SELECTOR SWITCH

When the circuit selector switch is in the OFF position, power is turned off. Turning this switch to the right turns on power and also selects the circuit to be used. Two positions, marked – DC and +DC, connect the meter circuit for measuring DC volts and act as a meter reversing switch. With the ground lead connected to the chassis or the common circuit connection, set the switch at +DC for measuring positive voltage or at – DC for measuring negative voltage.

When the switch is set at AC, meter circuits are connected for AC and RF voltage measurements. The internal peak-to-peak vacuum tube rectifier changes the incoming voltage into a proportional DC voltage to be measured with the meter circuits.

When the switch is set at OHMS, an internal battery and the associated resistors are switched into the meter circuit to provide for DC resistance measurements.

RANGE SELECTOR SWITCH

The range switch selects the desired range for the circuit which has been connected with the circuit selector switch. There are seven positions; each position is marked for full scale voltage indication for either DC or AC (R.M.S.) voltage measurements and is also marked for the multiplier factor to be used when measuring resistances.

ZERO ADJUST (ELECTRICAL)

After the power has been turned on and the circuit selector switch has been set for any of its on positions, the knob marked ZERO ADJUST should be turned either to the right or the left until the meter pointer rests over the zero marks at the left side of the scale. Connect the probe and ground lead together while making this adjustment. It may be necessary to readjust for zero when changing ranges or circuits.

A zero shift may occur when changing from AC to DC functions because of the line voltage. Correct for this change, when it occurs, by setting the ZERO ADJUST knob for a zero indication on the 1.5 V DC range; then turn the function switch to AC (still using the 1.5 V range). If the meter does not indicate zero, reach through the hole in the case-back with a small screwdriver and adjust R-32 for a zero indication.

OHMS ADJUST

With the circuit selector switch set at OHMS, separate the test leads. The pointer should move across the meter scale and rest near the right end of the scale. Turn the OHMS ADJUST knob until the pointer is directly over the mark at the right of the scale.

MEASURING DC VOLTAGES

NOTE: See CAUTION notice on page 7.

1. Place the circuit selector switch in the −DC or +DC position, depending on the polarity of the voltage to be measured.
2. Rotate the range switch to select the full scale range desired. While the Model 311 circuits will not be easily damaged, it is best to set the range switch for a higher range than needed as a protection to the balance tube and the meter movement. After the first reading, set the range switch for a lower range if necessary to provide a more accurate reading.

3. Connect the crocodile clip of the GROUND test lead to the reference point for the voltage to be measured.
4. Set the switch in the probe handle at DC. Connect the probe tip to the point to be measured.
5. Observe the meter reading. If the meter pointer deflects to the left, circuit polarity is opposite to that for which the circuit selector switch is set; set the circuit selector switch for the correct polarity.
6. Read the meter scale indication at the pointer position on one of the black arcs. For the 1.5, 15, 150, and 1500 volt ranges, use the arc marked from 0 to 1.5. For the 5, 50, and 500 volt ranges, use the arc marked from 0 to 5.

Note. To measure more than 1500 volts DC, see information on high voltage accessory probe in Section V.

ZERO CENTER DC VOLTAGES

1. Set circuit selector switch at either −DC or +DC. Set the switch on the probe handle at DC and short the test leads together.
2. Rotate the ZERO ADJUST knob until the meter pointer rests over the zero center marker.
3. Set the range selector switch to a range which is at least twice the probable circuit voltage. Connect the test leads to the circuit the same as for DC voltage measurements.

4. Observe the meter pointer indication on the arc marked DC. If the circuit selector switch is set at +DC, positive voltages will be indicated above the center mark; negative voltages will be indicated to the left. Each side of the scale represents one half of the range being used.

The purposes for which the zero center scale is used usually do not require an accurate measurement of the quantity of voltages, but merely an indication of a balanced condition. An example is alignment of an FM discriminator; the desired balanced condition will result in a zero center indication, while a misaligned condition will cause some deflection away from the zero center.

MEASURING AC VOLTAGES, 30 TO 100,000 CYCLES PER SECOND

NOTE: See CAUTION notice on page 7.

1. Place the circuit selector switch in the AC position.
2. Set the range switch in the desired range position.
3. Connect the clip for the GROUND test lead to the chassis or reference point in the circuit to be measured.
4. Set the switch on the probe handle at AC-OHMS. Connect the probe tip to the point in the circuit where voltage is to be measured.
5. Observe the meter readings. The pointer indicates voltages on two arcs for AC measurements – R.M.S.

and peak-to-peak. Both values apply when the input waveshape being measured is a sine wave. Only the peak-to-peak value applies when the input waveshape is not a sine wave.

For range switch position	Read R.M.S. voltages on	Read peak-to-peak voltages on
1.5 V	Black arc marked 0-1.5 LO AC ONLY	Red arc marked 0-4.2 (below black arc marked 0-1.5 LO AC ONLY)
5 V	Black arc 0-5	Red arc 0-14
15 V	Black arc 0-1.5(x10)	Red arc 0-4.2(x10)
50 V	Black arc 0-5 (x10)	Red arc 0-14(x10)
150 V	Black arc 0-1.5(x100)	Red arc 0-4.2(x100)
500 V	Black arc 0-5 (x100)	Red arc 0-14(x100)
1500 V	Black arc 0-1.5(x1000)	Red arc 0-4.2(x1000)

7. Turn off circuit power and discharge capacitors before removing the probes.

DC RESISTANCE MEASUREMENTS

1. Place the circuit selector switch in the OHMS position.
2. Rotate the range selector switch to set any desired range.
3. Set the switch on the probe handle at AC-OHMS.
4. Short the AC-Ohms probe and the common test clip together and check the meter pointer for a zero indication. If necessary, rotate the ZERO ADJUST control to obtain a zero indication.

5. Separate the AC-Ohms probe and common test lead. The meter pointer should deflect to full scale. Set the OHMS ADJUST control for exactly full scale deflection. When the pointer cannot be brought up to full scale, the battery inside the case needs replacement; see information in Section III, Maintenance.
6. Be sure no voltage is present in the circuit in which resistance is to be measured. Turn off circuit power and discharge all capacitors.
7. Connect the AC-Ohms probe and the common test clips to the two points between which DC resistance is to be measured.
8. Read the arc marked OHMS at the pointer position. Multiply the reading by the value indicated at the range switch position. K stands for 1000. M stands for 1,000,000. The result will be resistance in ohms.

SECTION III

MAINTENANCE

CARE OF INSTRUMENT

The Simpson Vacuum Tube Voltmeter Model 311 is a durable and rugged instrument which will withstand the wear and tear of every day service work. But it should be protected from rough treatment, dropping, or other unnecessary severe shock; the panel meter has delicate jewel-mounted parts which will be damaged under these conditions. With proper care, the Model 311 should provide many years of excellent operation.

REMOVAL FROM CASE

To remove the instrument from its case to replace the battery or to inspect and service its internal parts, remove the two screws through the case back. Slide the front panel straight forward out of the case. All of the internal parts in the instrument are attached to the front panel and will come out with it. The line cord passes through a hole in the rear of the case; if necessary for access to the internal parts, remove the two screws which hold the plate through which the line cord passes and pull the entire line cord and plug through the case opening.

BATTERY REPLACEMENT

The 1.5 volt dry cell battery inside the case of the Model 311 is used as the fixed-voltage source for ohmmeter operation. When the meter pointer cannot be brought up to full scale deflection with the OHMS ADJUST control, with test probes separated and the function switch at OHMS, replace the battery with a fresh equivalent. This is a size C flashlight type cell. Open the case for access and observe the polarity of the old battery in its clamp mounting. Observe this polarity when you mount the new battery in the clamp.

NOTE

Do not use steel-jacketed batteries. They will affect meter calibration.

CALIBRATION

The Simpson Vacuum Tube Voltmeter Model 311 has been calibrated carefully at the factory, and changes should not be necessary. After a long period of use, or when any internal parts have been replaced, recalibration may be replaced, recalibration may be required. Use the following procedure:

1. Allow the instrument to warm up for a period of at least one hour. Set the function switch at −DC and the range switch at 1.5V.
2. Turn the ZERO ADJUST knob to the extreme left and note the position of the meter pointer. Return meter pointer to zero. Turn the function switch at +DC and turn the ZERO ADJUST knob to the extreme right. Note the meter pointer position again. The pointer position should be the same for both polarities. If there is any difference between them, adjust potentiometer R29 until the readings are the same. See figure 2, schematic diagram, to help locate potentiometer R29 inside the instrument.
3. With the function switch at −DC, the switch on the probe handle at DC, and the probes shorted together, set the ZERO ADJUST control for a zero pointer indication.
4. Turn the function switch to AC and set the switch on the probe handle at AC. If the pointer does not rest at zero, adjust potentiometer R32 to correct it. See figure 3, schematic diagram, to help locate potentiometer R32 inside the instrument.

5. Turn the function switch to – DC and set the switch on the probe handle at DC again. Connect the probes to a known value of DC voltage. Check the meter indication. If it is not correct, adjust potentiometer R20 to calibrate the instrument. See figure 2, schematic diagram, to help locate potentiometer R20 inside the instrument.
6. Turn the function switch to AC and set the switch on the probe handle at AC again. Connect the probes to a known value of AC voltage. Check the meter indication. If it is not correct, adjust potentiometer R21 to calibrate the instrument. See figure 2, schematic diagram, to help locate potentiometer R21 inside the instrument.

TUBES AND REPLACEMENT

Two tubes are used in the Model 311. One is a type 6AL5, used as a peak-to-peak rectifier for all AC voltages. The other is a type 12AU7, which operates in the bridge circuit for all measurements.

When it is necessary to replace the type 12AU7 tube, the new tube must be aged for at least 48 hours to eliminate its transient characteristics before the instrument is recalibrated. Place this new tube in the socket and turn on power for the instrument. Leave the instrument connected and operating for the 48-hour aging period. Then recalibrate it with the six steps shown under CALIBRATION above.

REPLACEMENT OF RESISTORS, CAPACITORS, ETC.

Most of these parts in the Model 311 are mounted on the printed circuit boards. When replacement is necessary, first obtain an exact equivalent part; then clip the defective part off the printed circuit board, leaving its leads to use as connections for the replacement. Carefully twist the leads for the replacement around those leads which were left in the board, and solder each connection. Trim away all excess wire and check to see that there are no short circuits to other parts mounted nearby.

A list of authorized Repair Stations and Parts Depots is shown in the rear of the manual. Contact your nearest Repair Station to obtain service or repair for your instrument. If you wish to order a replacement part, use the Simpson part number and send the order to your nearest Parts Depot.

PARTS LIST

Reference Symbol	Description	Simpson Part No.
B1	Battery, 1.5 volts, size C cell	1-111801
C1	Capacitor, .01 μf, 400 v, paper	1-113896
C2	Capacitor, .02 μf, 400 v, paper	1-113898
C3	Capacitor, .01 μf, 1600 v, paper	1-115505
C4	Capacitor, .01 μf, 400 v, paper	1-113896
C5	Capacitor, 20 μf, 150 v	1-114105
CR1	Rectifier, 65 ma, 130 v	1-116255
R1	Resistor, 9.4 ohms, 1%, bobbin	0-008290

PARTS LIST

Reference Symbol	Description	Simpson Part No.
R2	Resistor, 100 ohms, 1%, 1/2 w	1-117057
R3	Resistor, 1000 ohms, 1%, 1/2 w	1-117058
R4	Resistor, 10K, 1%, 1/2 w	1-117059
R5	Resistor, 100K, 1%, 1/2 w	1-117060
R6	Resistor, 1 megohm, 1%, 1/2 w	1-117061
R7	Resistor, 10 megohms, 1%, 1 w	1-117062
R8	Resistor, 10.5 megohms, 1%, 2 w	1-116678
R9	Resistor, 3 megohms, 1%, 1/2 w	1-113432
R10	Resistor, 1.05 megohms, 1%, 1/2 w	1-116680
R11	Resistor, 300K, 1%, 1/2 w	1-113995
R12	Resistor, 105K, 1%, 1/2 w	1-116681
R13	Resistor, 30K, 1%, 1/2 w	1-113308
R14	Resistor, 15K, 1%, 1/2 w	1-113347
R15	Resistor, 9 megohms, 1%, 2 w	1-116679
R16	Resistor, 1.3 megohms, 1%, 1/2 w	1-116682
R17	Resistor, 20 megohms, 1%, 2 w	1-113390
R18	Resistor, 7 megohms, 1%, 1 w	1-116689
R19	Potentiometer, 10K, 30%	1-116258
R20	Rheostat, 3000 ohms, 10%, 1 w	1-115678
R21	Rheostat, 5000 ohms, 10%, 1 w	1-116254
R22	Resistor, 1 megohm, 10%, 1/2 w	1-113952
R23	Resistor, 100K, 10%, 1/2 w	1-113949
R24	Resistor, 100K, 10%, 1/2 w	1-113949
R25	Potentiometer, 1000 ohms	1-116259
R26	Resistor, 270 ohms, 10%, 1/2 w	1-115386
R27	Resistor, 270 ohms, 10%, 1/2 w	1-115386
R28	Resistor, 12K, 10%, 1/2 w	1-115655

PARTS LIST

Reference Symbol	Description	Simpson Part No.
R29	Potentiometer, 1000 ohms	1-116511
R30	Resistor, 10K, 10%, 1/2 w	1-111671
R31	Resistor, 8.2K, 10%, 1/2 w	1-113050
R32	Potentiometer, 3000 ohms	1-116512
R33	Resistor, 27 ohms, 10%, 1/2 w	1-116675
R34	Resistor, 22 megohms, 10%, 1/2 w	1-116674
R35	Resistor, 22 megohms, 10%, 1/2 w	1-116674
R36	Resistor, 22 megohms, 10%, 1/2 w	1-116674
R37	Resistor, 22 megohms, 10%, 1/2 w	1-116674
T1	Power transformer	1-116490
V1	Tube, type 6AL5	1-114084
V2	Tube, type 12AU7 (aged)	3-310744
	Knobs, small	1-115658
	Knobs, large	1-115548
	Meter movement	15-AC2311
	DC-AC/OHMS Test Lead	0733
	Ground Lead	0734
	Case with handle	10-890308

SECTION IV

APPLICATIONS

The extremely high input resistance of the Simpson Vacuum Tube Voltmeter Model 311 permits it to be used in many applications where a voltmeter with less sensitivity would result in excessive circuit loading. The following suggestions show only a few sample uses for which it will be found to be a superior instrument.

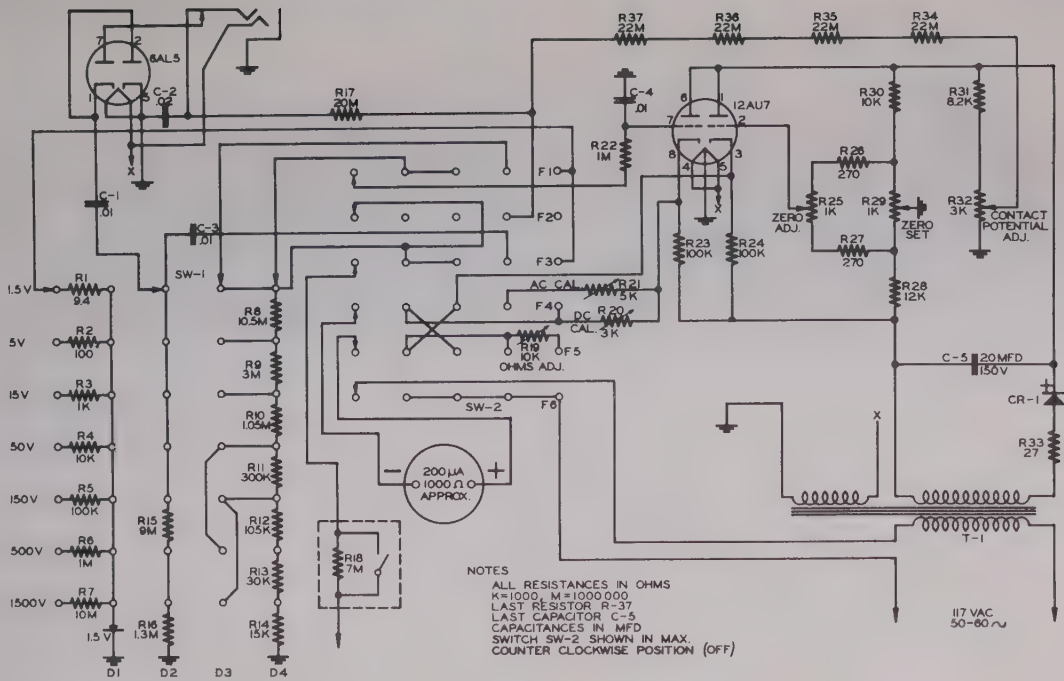

FIGURE 2. SIMPSON VACUUM TUBE VOLTMETER MODEL 311, SCHEMATIC DIAGRAM

MEASURING PLATE VOLTAGES

Lower resistance voltmeters will reduce a plate voltage when it is measured, especially when there is a high resistance plate load. Such voltages will be measured accurately with the model 311 because its high input impedance for all ranges will reduce this loading interference.

PHASE INVERTER BALANCE

The two sections of a push-pull circuit may be checked for balance with the Model 311. With a signal generator connected to the amplifier input, measure the plate and grid voltages and compare them at each similar circuit point.

MEASURING STAGE GAIN

The Model 311 is an ideal instrument for measuring amplifier stage gain. Any signal frequency from 30 cycles through 100,000 cycles will be indicated on the meter when the function switch is set at AC. Apply the output of a signal generator to the amplifier input, and measure and compare the input and output signal for each stage. The ratio of voltage between the output and the input represents the stage gain. When the Model 311 is set to measure AC voltages, a series capacitor, C3, blocks any DC present and prevents it from interfering with the readings.

AVC VOLTAGE

The use of the Simpson Volt-Ohmmeter Model 311 to measure A.V.C. voltages is possible due to the high input

resistance of the D.C. voltage circuit which has little or no noticeable loading effect on such a circuit. Connecting the Model 311 across the A.V.C. network is often more convenient than using an output meter for alignment purposes, as the volume control may be set at its minimum position. It is not necessary to disconnect the A.V.C. to prevent its interfering with the alignment procedure.

MEASURING GRID VOLTAGES

The high input resistance of the Model 311 makes it possible to measure voltage between the control grid and cathode of a tube without any loading effect. The output of a local oscillator may be checked throughout its tuning range; when it is oscillating, a small voltage is present and when it stops oscillating there is no voltage between the grid and the cathode.

MEASURING BIAS VOLTAGES

Bias voltages are usually small. The ranges of the Model 311 permit accurate measurement of bias, even when it is only a fraction of one volt, without loading interference.

DISCRIMINATOR ADJUSTMENT

The zero center mark on the dial of the Model 311 permits easy adjustment of a discriminator stage. With the probes connected across the discriminator load resistors and the instrument set up for zero center DC voltage operation, discriminator balance will be shown when the meter pointer

is at the zero center mark. Any unbalance in the discriminator will cause the pointer to be deflected to the right or to the left of the zero center mark.

FM ALIGNMENT

By connecting the Model 311 across the first limiter grid leak resistor, a reading will be obtained for FM alignment purposes. Adjust the circuits for a maximum indication. Follow the receiver manufacturer's instructions for the exact procedure as it applies to his particular receiver.

COUPLING AND BY-PASS CAPACITORS

A coupling capacitor or a bypass capacitor normally will present a low impedance for AC at the frequencies which it is designed to handle. To identify an open capacitor in either of these applications, measure the AC voltage at each side of the capacitor in its circuit when a normal frequency is applied through the circuit; a good capacitor will show almost as much voltage at its output as is present at its input. An open capacitor will show a normal or high input voltage, but little or no output voltage.

To identify a shorted capacitor, isolate it from its circuit by removing either one of its leads. Then set the Model 311 for OHMS measurements on a low range and measure the resistance across the capacitor. If the meter shows a drop towards zero when the probes are first connected to the capacitor, and then rises towards the high end of the scale, wait until the pointer comes to rest to read the resistance

across the capacitor. This condition is normal, and the amount of such action will be determined by a combination of the amount of capacity and the ohmmeter range used.

SIGNAL TRACING

The Model 311 is very useful for signal tracing or for examining a radio circuit at various points in audio or radio frequency circuits. Its low capacity accessory high frequency probe permits its use in high frequency circuits such as are present in FM and TV receivers.

SECTION V

ACCESSORY PROBES

HIGH FREQUENCY PROBE

DESCRIPTION

High Frequency Probe, p/n 0731, for use with the Simpson Vacuum Tube Voltmeter Model 311 is shown in figure 3. It has a dual diode, type 6AL5 tube, mounted in the probe handle together with an input capacitor. There is a short ground lead included on the probe handle to minimize the length of all connections for RF applications.

Any RF voltage which is contacted will be changed into a proportional DC voltage in the full wave rectifier and will be indicated on the meter in terms of both its RMS value (if it has a sine wave shape) and its peak-to-peak value.

FIGURE 3. ACCESSORY HIGH FREQUENCY PROBE FOR USE WITH SIMPSON VACUUM TUBE VOLTMETER MODEL 311

The instrument end of the high frequency probe lead terminates in a two circuit phone plug which connects in the RF PROBE jack on the front panel of the Model 311. The measured voltage and the filament power for the rectifier tube are both connected through the phone plug.

NOTE

When the accessory high frequency probe is connected in the RF PROBE jack of the Model 311, the regular probes cannot be used to measure AC voltages.

SPECIFICATIONS

Frequency response	Flat within ±5% from 50 cycles to 100 megacycles
Voltage range	0 to 150 volts RMS 0 to 400 volts peak-to-peak
Probe input capacity	10 $\mu\mu f$
Meter indications	RMS values for sine waves Peak-to-peak values for all inputs.

OPERATION

To use the accessory High Frequency Probe, connect its phone plug into the RF PROBE jack on the front of the Model 311. Follow the normal procedures for AC voltage measurements, using the High Frequency Probe and its special short ground lead to contact all points for measurement.

When the accessory High Frequency Probe is connected in the Model 311, the phone plug automatically opens a circuit for the rectifier tube within the instrument and disables the regular AC voltage circuits. It will not affect instrument operation for either DC voltage or resistance operation.

HIGH DC VOLTAGE PROBE

DESCRIPTION

Accessory probe, p/n 0732, is available for use in high DC voltage measurements. It has a multiplier resistor in

the probe handle which will increase total input resistance to 2200 megohms. Basic instrument ranges will be increased to 100 times the value marked on the front panel.

OPERATION

Remove the regular probes from the AC DC OHMS and GROUND jacks on the front panel of the Model 311. Connect the accessory high voltage probe to the AC DC OHMS jack; it has a special ground lead which is connected to the meter automatically. Proceed as for ordinary DC voltage measurements, with ranges equal to 100 times the range switch position markings.

RANGE SWITCH POSITION	INSTRUMENT RANGE WITH ACCESSORY H-V PROBE
15 V	0-1500 volts DC
50 V	0-5000 volts DC
150 V	0-15,000 volts DC
500 V	*0-50,000 volts DC

*Full range indication would be 50,000 volts; maximum allowable voltage for safe operation is 30,000 volts.

WARNING

Do not apply more than 30,000 volts to the circuit of the High Voltage Probe. Greater voltages may cause irreparable damage to the probe as well as to the instrument.

SIMPSON WARRANTY REPAIR STATIONS AND PARTS DEPOTS

**ARIZONA, PHOENIX
Metercraft, Inc., 3304 N. 24th Street
States: Arizona
Phone: Area Code 602, CRestwood 9–5287

CALIFORNIA, LOS ANGELES
Quality Electric Company, 3700 South Broadway
States: So. California below Fresno and Arizona
Phone: Area Code 213, ADams 2–4201

CALIFORNIA, SAN FRANCISCO
Pacific Electrical Instrument Lab, 111 Main Street
States: No. California above Fresno and Nevada
Phone: Area Code 415, GArfield 1–7185

**CANADA, LONDON, ONTARIO
Bach-Simpson Ltd., 1255 Brydges Street, P.O. Box 484
Phone: Area Code 519, GLadstone 1–9490

COLORADO, DENVER
Meter-Master Instrument Service, 2379 S. Downing St.
States: Wyoming, Utah, Colorado, and New Mexico
Phone: Area Code 303, RAce 2–8670

CONNECTICUT, NEW HAVEN
Kaufman Instrument Labs, Inc., 810 Dixwell Avenue
States: Connecticut
Phone: Area Code 203, SPruce 6–7201

FLORIDA, ORLANDO
Electro Tech, Inc., Florida Division, 307 - 27th Street
States: Florida
Phone: Area Code 305, GArden 3–5589

*Parts Depots only; no repairs.
**Repair Stations only; no resale of parts.
All others repair instruments and sell repair parts.

GEORGIA, ATLANTA
Electro-Tech, Inc., 690 Murphy Ave., S.W.
States: Alabama, Georgia, N. & S. Carolina, Tennessee
Phone: Area Code 404, PLaza 3–4128

**ILLINOIS, CHICAGO
Simpson Electric Company, 5200 W. Kinzie Street
Phone: Area Code 312, FStebrook 9–1121

*ILLINOIS, CHICAGO
Pacific Indicator Company, 5217 W. Madison Street
States: Chicago, Wisconsin and Indiana

**KANSAS, SHAWNEE MISSION
Sturtz Instrument Co., 4705 Mission Road
States: Kansas
Phone: Area Code 913, STarline 1–4711

LOUISIANA, NEW ORLEANS
Industrial Instrument Works, 3328 Magazine St.
States: Arkansas, Mississippi, and Louisiana
Phone: Area Code 504, TWinbrook 5–5621

MASSACHUSETTS, CAMBRIDGE
Alvin C. Mancib Company, 363 Walden Street
States: Vermont, New Hampshire, Massachusetts,
Rhode Island, and Maine
Phone: Area Code 617, UNiversity 4–2494

MICHIGAN, DETROIT
Ram Meter, Inc., 1100 Hilton Road, Ferndale
States: Michigan
Phone: Area Code 313, LIncoln 7–1000

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MINNESOTA, MINNEAPOLIS
Instrumentation Services, 917 Plymouth Avenue
States: Minnesota, North and South Dakota
Phone: Area Code 612, KEllogg 7–5411

MISSOURI, ST. LOUIS
Scherrer Instruments, 5449 Delmar Blvd.
States: Illinois below Peoria, Iowa, Missouri
Phone: Area Code 314, FOrest 7–9800

NEW JERSEY, RIVERDALE
A & M Instrument Service, Inc., 11 Hamburg Turnpike
States: New Jersey
Phone: Area Code 609, MArket 4–7757

NEW YORK, BUFFALO
Electrical Instrument Labs., 932 Hertel Avenue
States: New York State except Met. New York
Phone: Area Code 716, EXport 2–2726

NEW YORK, GREAT NECK, LONG ISLAND
Simpson Instrument Service Corp., 130 Cutter Mill Rd.
States: Metropolitan New York
Phones: Area Code 212, MUrray Hill 3–0674,
HUnter 2–3103

NEW YORK, LONG ISLAND CITY
A & M Instrument Service, Inc., 48-01 31st Street
States: Metropolitan New York
Phone: Area Code 212, RAvenswood 6–4343

**NEW YORK, SYRACUSE
Syracuse Instrument Lab, 4895 South Ave., Box 96
Phone: Area Code 315, HYatt 2–1651

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**Repair Stations only; no resale of parts.
All others repair instruments and sell repair parts.

OHIO, CLEVELAND
Weschler Electric Company, 4250 W. 130th Street
States: Ohio and Kentucky
Phone: Area Code 216, CLearwater 1–4609

**OKLAHOMA, TULSA
Tri-State Instrument Lab., 3244 East 15th Street
States: Oklahoma
Phone: Area Code 918, WE 6–0489

**OREGON, PORTLAND
The Instrument Laboratory, 1910 N. Killingsworth St.
States: Oregon
Phone: Area Code 503, BElmont 4–6683

PENNSYLVANIA, PHILADELPHIA
Sunshine Scientific Instrument, 1810 Grant Avenue
States: Pennsylvania, Maryland, Delaware, and
New Jersey below Trenton
Phone: Area Code 215, ORchard 3–5600

†TEXAS, DALLAS
Ultra Instrument Laboratories, 3515 Swiss Ave.,
Suite 117
Phone: Area Code 214, TAylor 6–6395

VIRGINIA, FALLS CHURCH
United Instrument Lab., Inc., 110 Jefferson St.
States: Virginia, West Virginia, Washington, D.C.
Phone: Area Code 703, JEfferson 2–1212

WASHINGTON, SEATTLE
The Instrument Lab, Inc., 934 Elliott Avenue West
States: Oregon, Washington, Idaho, and Montana
Phone: Area Code 206, ATwater 3–5850

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†Parts sales for Texas and Oklahoma; Repair, Texas only.
All others repair instruments and sell repair parts.

WARRANTY

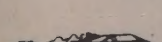
SIMPSON ELECTRIC COMPANY warrants each instrument and other articles of equipment manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any instrument or other article of equipment which shall within 90 days after delivery of such instrument or other article of equipment to the original purchaser be returned intact to it, or to one of its authorized service stations, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON ELECTRIC COMPANY neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its products.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the SIMPSON ELECTRIC COMPANY factory or authorized service stations, nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

Simpson ELECTRIC COMPANY

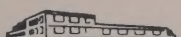
5200 Kinzie St., Chicago 44, Illinois • Phone: EStebrook 9-1121 • Long Distance Dial 312

In Canada: Bach-Simpson, Ltd., London, Ontario



LAC DU FLAMBEAU PLANT
WISCONSIN

LAKE STREET PLANT
CHICAGO



KINZIE STREET PLANT
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AURORA PLANT
AURORA, ILL.

Quality is the indispensable component of every Simpson instrument . . . . . .